

AMENDMENTS TO THE CLAIMS:

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

Listing of Claims:

1. (Currently Amended) A light regulating device comprising:

a photonic crystal including a material that is capable of varying its refractive index in accordance with an electric field, the photonic crystal having a photonic bandgap in a specific frequency range; and

an upper transparent electrode and a lower transparent electrode arranged on an upper side and a lower side of the photonic crystal, respectively, to which a voltage is applied, wherein the upper transparent electrode is at an optical input surface of the photonic crystal,

wherein a size of the photonic bandgap of the photonic crystal is controlled by the voltage applied between the upper transparent electrode and the lower transparent electrode.

2. (Original) The light regulating device as claimed in claim 1, wherein a reflection amount of visible light reflected in a specific frequency range from the photonic crystal is variable based on an electric field applied to the photonic crystal.

3. (Original) The light regulating device as claimed in claim 1, wherein a penetration amount of visible light penetrated in a specific frequency range from the photonic crystal is variable based on an electric field applied to the photonic crystal.

4. (Original) The light regulating device as claimed in claim 1, further comprising:

an upper transparent substrate and a lower transparent substrate having the upper and lower transparent electrodes, respectively, coated thereon, the upper transparent substrate and

the lower transparent substrate being capable of applying an electric field to the photonic crystal, wherein the upper transparent substrate and the lower transparent substrate are attached on the upper side and the lower side of the photonic crystal, respectively.

5. (Original) A photonic crystal display device utilizing bandgap controls, comprising:

a plurality of photonic crystals including a material that is capable of varying its refractive index in accordance with an electric field, each of the plurality of photonic crystals having a photonic bandgap in a different frequency range; and

a plurality of transparent electrodes formed on opposing sides of each of the plurality of photonic crystals for independently applying a respective predetermined electric field to each of the plurality of photonic crystals,

wherein a size of a photonic bandgap of each of the plurality of photonic crystals is controlled by the electric voltage respectively applied to the corresponding one of the plurality of transparent electrodes.

6. (Original) The photonic crystal display device as claimed in claim 5, wherein the plurality of photonic crystals are arranged on a two-dimensional plane.

7. (Original) The photonic crystal display device as claimed in claim 5, wherein the plurality of photonic crystals are vertically arranged.

8. (Original) The photonic crystal display device as claimed in claim 5, wherein a reflection amount of visible light respectively reflected in a specific frequency range from

each of the plurality of photonic crystals is variable based on the electric field applied to that one of the plurality of photonic crystals.

9. (Original) The photonic crystal display device as claimed in claim 5, wherein a penetration amount of visible light respectively penetrated in a specific frequency range from each of the plurality of photonic crystals is variable based on the electric field applied to each one of the plurality of photonic crystals.

10. (Original) The photonic crystal display device as claimed in claim 5, further comprising:

a plurality of transparent substrates on which a pattern of the transparent electrodes capable of independently applying the predetermined electric field to each of the plurality of photonic crystals is coated are attached on sides of each of the plurality of photonic crystals.

11. (Original) The photonic crystal display device as claimed in claim 5, further comprising:

a plurality of insulation spacers formed between each of the plurality of photonic crystals to electrically and spatially separate each of the plurality of photonic crystals.

12. (Previously Presented) The photonic crystal display device as claimed in claim 5, wherein at least one of the plurality of the transparent electrodes is interposed between a corresponding photonic crystal and a viewing surface of the photonic crystal display device.

13. (Previously Presented) The photonic crystal display device as claimed in claim 5, wherein a transparent electrode is interposed between each of the plurality of photonic crystals and a viewing surface of a photonic crystal display device.

14. (Previously Presented) The photonic crystal display device as claimed in claim 5, wherein one transparent electrode for each of the plurality of photonic crystals is at an optical input surface of a corresponding photonic crystal.

15. (Previously Presented) The photonic crystal display device as claimed in claim 5, further comprising insulating spacers between adjacent photonic crystals.

16. (Previously Presented) The photonic crystal display device as claimed in claim 5, wherein each of the plurality of photonic crystals has a unique pair of opposing transparent electrodes.

17. (Canceled).

18. (Previously Presented) A method of forming a light regulating device,
comprising:

forming a first transparent electrode on an optical input surface of a photonic crystal;

and

forming a second transparent electrode on a surface of the photonic crystal, opposite the optical input surface.

19. (Previously Presented) The method as claimed in claim 18, further comprising connecting a power supply to the first and second transparent electrodes.

20. (Previously Presented) The method as claimed in claim 18, further comprising:

providing a third transparent electrode on an input surface of another photonic crystal;
and

providing a fourth transparent electrode on a surface of the another photonic crystal, opposite the input surface.

21. (Previously Presented) The method as claimed in claim 20, wherein the photonic crystal and the another photonic crystal are arranged horizontally.

22. (Previously Presented) The method as claimed in claim 20, wherein the photonic crystal and the another photonic crystal are arranged vertically.

23. (Previously Presented) The method as claimed in claim 20, further comprising:
electrically insulating the photonic crystal and the another photonic crystal from one another.

24. (Previously Presented) The method as claimed in claim 20, wherein at least two of the first, second, third and fourth transparent electrodes are individual electrodes.